-continued

Example	Film		Thermal conductivity mW/mK
16	Cellulosetriacetate	"LA"	16
17	Polycarbonate	"PC"	15
18	Polyethylenenaphthalate	"PEN"	18
19	Polycaprolactam		18
20	Polyhexamethyleneadipamide		17
21	Polyundecanoamide		16
22	Polyimide		19

Example 23

Analogously to the production process explained in Example 1, a high-density polyethylene HDPE film was used and placed in the holder. A 1-mm thick layer of a GH 50.502 glass fibre mat (manufactured by "Glasfaser Regensburg") was laid on the sol, which had been previously annealed at 600° C. for 30 minutes. The sol was produced analogously to Example 1, and poured over the fibre glass mat. This forms a 1-mm thick layer of sol on the HDPE film, within which the mat is evenly distributed. The processing that follows is as described in Example 1. After drying, the film coated with the aerotgel is covered with a second layer of HDPE film. Since all the layers are transparent, the fibre structure of the included glass fibre mat is clearly visible. The thermal conductivity of the sample was measured at 18 mW/mK.

Example 24

As in Example 23, a PET film was used as the base. A 2-mm thick, fibre reinforced layer of aerogel was produced on this and then covered with an HDPE film. The thermal conductivity of the sample was measured at 16 mW/mK.

The following were tested analogously to Example 23:

Example	Film		Aerogel layer (mm)	Thermal conductivity mW/mK
25	Polyester (polyethyleneterephthalate)	"PET"	2	15
26	Low density polyethylene	"LDPE"	1	19
27	Ethylene-propylene copolymer	"EP"	1.5	17
28	Poly(4-methyl-pentane)	"TPX"	2	13
29	Polytetrafluorethylene	"PTFE"	2	15
30	Poly(1-butene)	"PB"	1	16
31	Polystyrene	"PS"	2	14
32	Polyvinylacetate	"PVAC"	1	17
33	Polyvinylchloride	"PVC"	1	18
34	Polyvinylidenechloride	"PVDC"	1.5	14
35	Polyvinylfluoride	"PVF"	1.5	16
36	Polyvinylacrylnitrile	"PAN"	2	13
37	Polymethylmethacrylate	"PMMA"	2	13
38	Polyoxymethylene	"POM"	2	15
39	Polyphenylenesulfon		1	16
40	Cellulosetriacetate	"LA"	1	17
41	Polycarbonate	"PC"	1.5	14
42	Polyethylenenaphthalate	"PEN	1	18
43	Polycaprolactam		2	15
44	Polyhexamethyleneadipamide		1	18
45	Polyundecanoamide		1	18
46	Polyimide		1	19

Example 47

60 ml of an aqueous dispersion of styrene/acrylate copolymer, solids content: 19%-wt (34 ml Mowilith DM 760, 26 ml water) were prepared in a 200 ml beaker and 125 ml hydrophobic aerogel granulate with a grain size ranging from 50 to 250 μm (settled apparent density 0.08 g/cm^3) were mixed with a propellor-type mixer at 1200 rpm, until a free-flowing suspension was formed. This was troweled onto a polyester film to form a 1-mm thick layer of thermal insulation adhesive. Next, a 2-mm thick, fibre-reinforced aerogel, produced from waterglass and microlith glass-needle mat was applied to it. Then a PET film, produced as for the base, was applied to the aerogel layer with the adhesive side down. The laminate prepared in this way was treated in an oven at 70° C. for 24 hours. The thermal conductivity of the laminate was measured at 24 mW/mK.

The following films were tested analogously to Example 47:

Example	Film		Aerogel layer (mm)	Thermal conductivity mW/mK
48	Polyester (polyethyleneterephthalate)	"PET"	2	14
49	Low density polyethylene	"LDPE"	3	13
50	Ethylene-propylene copolymer	"EP"	4	14
51	Poly(4-methyl-pentane)	"TPX"	3	16
52	Polytetrafluorethylene	"PTFE"	2	18
53	Poly(1-butene)	"PB"	2	16
54	Polystyrene	"PS"	3	14
55	Polyvinylacetate	"PVAC"	1	19
56	Polyvinylchloride	"PVC"	1	20
57	Polyvinylidenechloride	"PVDC"	0.5	21
58	Polyvinylfluoride	"PVF"	2	20
59	Polyvinylacrylnitrile	"PAN"	3	16
60	Polymethylmethacrylate	"PMMA"	1	19
61	Polyoxymethylene	"POM"	2	15
62	Polyphenylenesulfon		2	17
63	Cellulosetriacetate	"LA"	2	18
64	Polycarbonate	"PC"	1.5	14
65	Polyethylenenaphthalate	"PEN"	1	19
66	Polycaprolactam		1	20
67	Polyhexamethyleneadipamide		2	15
68	Polyundecanoamide		1	17
69	Polyimide		4	13

What is claimed is:

1. A film comprising a mateiral selected from the group consisting of polyester, cellulose, polyolefins, polystyrenes, polymethyl(meth)acrylates, polyvinylchloride, polyamides and polycarbonates wherein it is coated on at least one surface with an aerogel coating which has been surface-modified via silyation and formed by (a) applying a sol to said at least one side, (b) polycondensing said applied sol and (c) drying.

2. A film as defined in claim 1, wherein SiO_2 aerogels are used in the aerogel coating.

3. A film as defined in claim 1, wherein the aerogels have hydrophobic surface groups.

4. A film as defined in claim 1, wherein the aerogels of the aerogel layer have porosities of greater than 60% and densities of less than 0.6 g/cm^3.

5. A film as defined in claim 1, wherein the aerogels have thermal conductivities of less than 40 mW/mK.

6. A film as defined in claim 1, wherein the aerogel coating contains an IR opacifier.

7. A film as defined in claim 1, wherein the aerogel coating contains fibers.

8. A film as defined in claim 1 wherein polyethylene terephathalate or polypropylene is used as film material.

9. A process for manufacturing a coated film as defined in claim 1, wherein a sol is applied to a film and converted to an aerogel coating by polycondensation and drying.

10. A process for manufacturing a coated film as defined in claim 1, wherein an aerogel coating is produced and cemented onto a film.

11. A film construct comprising a first and a second film, each film separately comprising a material selected from the group consisting of polyester, cellulose, polyolefins, polystyrenes, polymethyl(meth)acrylates, polyvinylchloride, polyamides and polycarbonates wherein a coat that, contains surface-modified by silyation aerogel powder and/or surface-modified by silylation aerogel granulate is arranged between said first and second film to which said coat is fused.

12. A film as defined in claim 11, wherein SiO_2 aerogels are used in the aerogel coat.

13. A film as defined in claim 11, wherein the aerogels have hydrophobic surface groups.

14. A film as defined in claim 11, wherein the aerogels of the aerogel coat have porosities of greater than 60% and densities of less than 0.6 g/cm^3.

15. A film as defined in claim 11, wherein the aerogels have thermal conductivities of less than 40 mW/mK.

16. A film as defined in claim 11, wherein the aerogel coat contains an IR opacifier.

17. A film as defined in claim 11, wherein the aerogel coat contains fibers.

18. A film as defined in claim 11, wherein polyethyleneterephthalate or polypropylene is used as film material.

19. A process for manufacturing a coated film as defined in claim 11, wherein the aerogel powder or aerogel granulate coat is applied to a film, a second film is laid thereon, and so fused or cemented to the first film that areas of the aerogel are included.

20. A thermal insulation material which comprises a coated film as defined in claim 1.

21. A film comprising a material selected from the group consisting of polyester, cellulose, polyolefins, polystyrenes, polymethyl(meth)acrylates, polyvinylchloride, polyamides and polycarbonates, which is coated on at least one side with an aerogel coating, wherein said aerogel coating is surface-modified via silyation and said coating comprises aerogel powder and/or aerogel granulate.

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